

Application No.: 10/066,007  
Amendment Dated: May 26, 2005  
Reply to Office Action Dated: December 22, 2004

### **REMARKS**

Claims 1-34, 39, and 51 have been cancelled, without prejudice.

Claim 52 has been amended to depend from claim 46.

Claims 35 and 44 have been amended to further clarify the recitation of "stringent hybridizing conditions." Support for these amendments is found in the specification at, for example, page 7, line 18 to page 8, line 14 and the Examples. See MPEP § 608.01(o).

Claims 40 and 41 have been amended to clarify that the term "hybridizes" refers to the same high stringency hybridization conditions recited in amended claim 35. Support for these amendments is found in the specification at, for example, page 7, line 18 to page 8, line 14 and the Examples. (*Id.*).

Claim 46 has been amended to recite "a polypeptide encoded by a polynucleotide selected from the group consisting of SEQ ID NO: 2, SEQ ID NO: 3, a polynucleotide that encodes the polypeptide of SEQ ID NO: 1, and a polynucleotide that hybridizes to the complement of SEQ ID NO: 2 or SEQ ID NO: 3 under the following hybridization conditions: 50% v/v formamide, 5X SSC, 2% w/v blocking agent, 0.1% N-lauroylsarcosine, 0.3% SDS at 42°C overnight and wherein the hybridizing polynucleotide encodes a polypeptide having astaxanthin synthetase activity in the presence of an electron donor, which is capable of reducing a reaction center of the polypeptide in a reaction mixture containing a reconstituted membrane." Support for this amendment is found in original claims 27 and 36-38, and in the specification at, for example, page 6, line 27 to page 7, line 30, and page 8, lines 19-30. See *In re Gardner*, 177 USPQ 396, 397 (CCPA 1973) and MPEP §§608.01(o) and (l).

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It is submitted that no new matter has been introduced by the foregoing amendments. Approval and entry of the amendments respectfully is requested.

**§112, Second Paragraph Rejection**

Claims 35-38 and 40-45 were rejected under 35 U.S.C. §112, second paragraph. (Paper No. 20041217 at 2).

In making the rejection, the Examiner asserted that in claims 35-38 and 40-45 the phrase "under stringent hybridization conditions" is unclear. (*Id.*). The Examiner advised that this rejection could be overcome by identifying the hybridization conditions. (*Id.*).

In accordance with the Examiner's advice and with a view toward furthering prosecution, claims 35 and 44 have been amended to further clarify the recitation of "stringent hybridizing conditions." Accordingly, it is respectfully submitted that the rejection is rendered moot and should be withdrawn.

Claims 40-41<sup>1</sup> were also rejected under 35 U.S.C. §112, second paragraph. (*Id.* at 3). In making the rejection, the Examiner asserted that in claims 40-41 the term "hybridizes" is "incomplete." (*Id.*)

With a view toward furthering prosecution, claims 40 and 41 have been amended to clarify that the term "hybridizes" refers to the high stringency conditions recited in amended claim 36. In view of the amendments to claims 40 and 41, it is respectfully submitted that the rejection has been rendered moot and should be withdrawn.

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<sup>1</sup> The Examiner's rejection asserts that "[c]laims 41-42" were rejected. We believe, however, that the Examiner intended to reject claims 40-41. If our assumption is wrong, the Examiner is asked to please state so on the record.

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### **§112, First Paragraph Rejections**

Claims 46-52 were rejected under 35 U.S.C. § 112, first paragraph, for lack of written description. (Paper No. 20041217 at 4). In making the rejection, the Examiner asserted that “[c]laims [46] (and its dependent claims 47-52) are directed to methods of producing astaxanthin utilizing a **genus** of astaxanthin synthetases and a **genus** of electron donors that have been inadequately described in the specification.” (*Id.*).

With a view toward furthering prosecution, claim 46 has been amended in the same manner as claims 35 and 44, which the Examiner has acknowledged would be allowable. Claim 46 has also been amended to recite that the electron donor is “capable of reducing a reaction center of the polypeptide.”

It is respectfully submitted that the disclosure in the specification supports the scope of claim 46, as amended. For example, the specification states that the claimed process for producing astaxanthin may be accomplished by contacting  $\beta$ -carotene and the presently claimed polypeptide(s) “in the presence of an appropriate electron donor.” (Specification, page 9, lines 11-22). The specification further discloses that an “appropriate electron donor” is identified by its ability to “reduce a reaction center of the enzyme” (*i.e.*, the presently claimed polypeptides). (*Id.* at lines 20-22). The specification further exemplifies such an electron donor as “cytochrome P450 reductase” (*Id.* at line 20) and provides an assay for identifying production of the target molecule - astaxanthin (see, *e.g.*, Example 4, page 24, lines 1-20). The specification further provides another assay for confirming astaxanthin production using the claimed process. (See, *e.g.*, Example 11, page 32, lines 15-28).


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In view of the foregoing, it is respectfully submitted that the disclosure of a specific function coupled with exemplification of a species of electron donors further coupled with assays which may be used to easily identify other members of the claimed genus of electron donors that are capable of reducing a reaction center of the enzyme and producing astaxanthin is more than sufficient to describe the presently claimed electron donors.

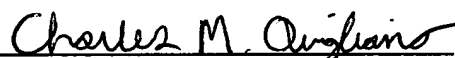
Accordingly, it is respectfully submitted that the rejection is rendered moot and should be withdrawn.

For the foregoing reasons, favorable action on the merits, including entry of the amendments, withdrawal of the rejections, and allowance of all the claims, respectfully is requested. If the Examiner has any questions regarding this paper, please contact the undersigned attorney.

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Mail Stop AF, Commissioner for Patents, P.O. Box. 1450 Alexandria, VA 22313-1450, on May 26, 2005.

  
Charles M. Avigliano, Reg. No. 52,578

Respectfully submitted,

By:   
Charles M. Avigliano  
Reg. No. 52,578  
BRYAN CAVE LLP  
1290 Avenue of the Americas  
New York, NY 10104-3300  
Phone: (212) 541-2000  
Fax: (212) 541-4630